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A Near-Infrared Stellar Census of Blue Compact Dwarf Galaxies: NICMOS[1] Detection of Red Giant Stars in the Wolf-Rayet Galaxy Mrk 178

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[1]Based on observations made with the NASA/ESA Hubble Space Telescope obtained from the Space Telescope Science Institute, which is operated by the Association of Universities for Research in Astronomy, Inc., under NASA contract NAS 5-26555.

abstract

We observed the Blue Compact Dwarf/Wolf-Rayet galaxy Mrk 178 with the NICMOS camera aboard HST. The galaxy is well resolved into individual stars in the near-IR; photometry in J and H yields color-magnitude diagrams containing 791 individual point sources. We discuss the stellar content, drawing particular attention to the intermediate age and/or old stars.

Mrk 178 is only the second Blue Compact Dwarf galaxy in which the red giant branch has been resolved, indicating stars with ages of at least 1-2 Gyr. This allows us to derive a distance of $\geq$4.2($\pm$0.5) Mpc. The near-IR color-magnitude diagram also exhibits an abundance of luminous, asymptotic giant branch stars. We find that this requires vigorous star formation several hundred Myr ago. Some candidate carbon stars are identified via their extreme near-IR color.

We argue that Mrk 178 is fundamentally an old galaxy, based on the NICMOS detection of red giants underlying the blue, starburst core, and its extended, faint halo of redder color.